Institute of Medicine Report: Gulf War and Health, Volume 6: Physiologic, Psychologic, and Psychosocial Effects of Deployment-Related Stress

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Gulf War and Health, Vol. 6: Physiologic, Psychologic, and Psychosocial Effects of Deployment-Related Stress

- 330-page report published on November 14, 2007 by the Institute of Medicine (IOM) of the National Academy of Sciences
- IOM published entire book on-line. It can be downloaded for free at: http://www.nap.edu/catalog.php?record_id=11922
- In 1998, Congress mandated that the Department of Veterans Affairs (VA) use a specific procedure to determine the illnesses that warrant a presumption of connection to service in the 1991 Gulf War.
- This mandate required VA to contract with the National Academy of Sciences to “conduct a comprehensive review and evaluation of the available scientific and medical information regarding the health status of Gulf War veterans.”
- Since 1998, VA has fulfilled this Congressional mandate by contracting with IOM to perform literature reviews on the health of Gulf War veterans.

Gulf War and Health Series

- Volume 1: Depleted Uranium, Pyridostigmine Bromide, Sarin, Vaccines
- Volume 2: Insecticides and Solvents
- Volume 3: Fuels, Combustion Products, and Propellants
- Volume 4: Health Effects of Serving in the Gulf War
- Volume 5: Infectious Diseases
- Updates for Sarin (2004) & Depleted Uranium (2008)

Committee's Task

- Comprehensive review, evaluation, and summary of the peer-reviewed scientific and medical literature regarding the association between deployment-related stress and long-term adverse health effects in Gulf War veterans.

- Specifically, the committee was to study the physiologic, psychologic, and psychosocial effects of stress.
  - Note: for this report, the term "health effect" encompasses all three effects.
  - Examples of physiologic: hypertension, diabetes
  - Examples of psychologic: PTSD, depression
  - Examples of psychosocial: marital conflict, incarceration

- Study's findings are to be applicable veterans of both the 1991 Gulf War and OEF and OIF.

Relevant Background

- Deployment to a war zone, whether or not combat is experienced, is sufficient to elicit a stress response.
- The stress response can be:
  - Adaptive
    - Prepares the individual for fight or flight
    - Can focus attention and physiological resources
  - Maladaptive
    - If too intense or prolonged or in vulnerable individuals, it can lead to illness
    - May be related to complex disruptions among the brain, and endocrine, immune, cardiovascular, and gastrointestinal systems
- Long-term effects may not be evident for many years.
- Chapter 4 of IOM report summarizes the biological effects of stress.

Approach

- **For the purposes of this report, IOM defines "deployment-related stress" as deployment to a war zone.**
  - The committee decided that studies that compared deployed vs. nondeployed populations would comprise the literature of interest.

- **What war-zone stressors do troops experience? (Detailed description in Chapter 3)**
  - Combat: e.g., being shot at, shooting at the enemy, seeing dead and maimed bodies, IEDs
  - Noncombat stressors: e.g., being away from family, boring/repetitive work, worry about employment on return
  - Sexual assault/harassment
  - Poor living conditions
  - Exposure to environmental contaminants and prophylactic measures, e.g., vaccines
- **Stressors may be different or exacerbated for**
  - Women (e.g., sexual assault/harassment, being a single parent)
  - Peacekeepers (e.g., uncertain rules of engagement)
  - Reserve/National Guard (e.g., lack of training, concerns about civilian life, post-deployment lack of support)
- **War-zone stress can be aggravated by:**
  - Uncertain length of deployment
  - Extended tours of duty
  - Multiple deployments
  - Limited communication among military personnel and with family

Specific Stressors during the 1990-91 Gulf War

- IOM summarized the stressors encountered during the 1990-91 Gulf War on page 11:
  - Uncertainty about possible exposures to chemical and biological weapons and other contaminants
  - Facing an enemy known to have used chemical weapons in the past
  - Difficult living conditions; harsh desert climate
  - Incomplete knowledge of the Iraqi forces they were going to engage
  - For reservists, difficulties of leaving families and jobs

Identifying the Literature

- Peer-reviewed literature only
- 3,000 papers retrieved and screened, with cut-off date of January 2007
- Studies of veterans from the 1991 Gulf War, as well as WWII, Korea, Vietnam, and OIF and OEF were included.
- Studies of foreign veterans were also included, including UK, Australian, Danish, Canadian troops.
- Some studies of peacekeepers were considered.

Evaluating the Literature

- IOM relied mainly on high-quality studies, which they called "primary studies," and which required:
  - Comparison of deployed veterans and non-deployed veterans with respect to the occurrence of a long-term health effect
  - Methodological rigor: adequate sample size, adjustment for confounders, statistical power to detect effect
  - Specificity of health effect: diagnosis or confirmation of health effect by a clinical evaluation, specific laboratory test, hospital record, or other medical record
  - For psychiatric disorders: use of standardized diagnostic interviews such as SCID, DIS, CIDI (Note, studies that relied solely on self-report were not considered high-quality.)
  - For psychosocial effects: use of validated or well-recognized instruments or data from government or other appropriate organization (e.g., National Death Index)

Conclusions

- IOM used five levels of evidence for association, with “causal association” being the highest level.
- The Executive Summary (pages 8-9) of the IOM report includes a list of 24 health effects in the five categories.

- Sufficient Evidence of a Causal Association:
- Evidence fulfills the guidelines for sufficient evidence of an association and satisfies several of the guidelines used to assess causality: strength of association, dose-response relationship, consistency of association, and temporal relationship.
  - No health effects in this category
  - IOM committee considered placing PTSD in this category; however, decided against it.

Sufficient Evidence of an Association

- Consistent association has been observed between deployment to a war zone and a specific health effect in human studies in which chance and bias, including confounding, could be ruled out with reasonable confidence, e.g., several high-quality studies report consistent associations, are sufficiently free of bias, and include adequate control for confounding.
  - Psychiatric disorders, including PTSD, other anxiety disorders, and depressive disorders
  - Alcohol abuse
  - Accidental death in the early years (~5) after deployment
  - Suicide in the early years (~5) after deployment
  - Marital and family conflict including intimate partner violence, particularly for those with PTSD

Limited but Suggestive Evidence of an Association

- Suggestive evidence of an association between deployment to a war zone and a specific health effect in human studies, but limited by the inability to rule out chance and bias, including confounding, with confidence. At least one high-quality study reports a positive association and other corroborating studies provide support for the association but are not sufficiently free of bias, including confounding.
  - Drug abuse
  - Chronic fatigue syndrome
  - Gastrointestinal symptoms consistent with functional GI disorders, such as IBS and functional dyspepsia
  - Skin disorders
  - Fibromyalgia and chronic widespread pain
  - Increased symptom reporting, unexplained illness, and chronic pain
  - Incarceration

Inadequate/insufficient Evidence to Determine Whether an Association Exists

- Evidence is of insufficient quantity, quality, or consistency to permit a conclusion regarding the existence of an association between deployment to a war zone and a specific health effect in humans.
  - Cancer (Note: several studies on cancer, but latency too short.)
  - Diabetes mellitus
  - Thyroid disease
  - Neurocognitive and neurobehavioral effects
  - Sleep disorders and objective measures of sleep disturbance
  - Hypertension
  - Coronary heart disease
  - Chronic respiratory effects
  - Structural gastrointestinal diseases
  - Reproductive effects
  - Homelessness
  - Adverse employment outcomes

Limited/Suggestive Evidence of No Association

- Evidence is consistent in not showing a positive association between deployment to a war zone and a specific health effect after exposure of any magnitude.
  - No health effects in this category

PTSD

- IOM devoted entire Chapter 5 to PTSD because of its strong association with combat.
- Highly comorbid with other psychiatric disorders, particularly major depression, generalized anxiety, and substance abuse.
- Combat and physical wounds were among the strongest risk factors for PTSD and other psychiatric disorders.
  - Other risk factors included: childhood maltreatment, presence of a pre-existing psychiatric disorder, poor social support on returning home, negative coping styles, and lack of hardiness.
  - Protective factors included: better education, higher military rank, having a stable family life, and having a sense of control.
- Much research being done on neuroimaging in PTSD and on the role of hormones in PTSD (epinephrine/norepinephrine, catecholamines, cortisol).

PTSD & Health Effects

- General lack of data on long-term health effects in veterans with PTSD. However, compared with veterans who did not have PTSD, some studies showed the veterans with PTSD have more:
  - Sleep disturbance
  - Increased heart rate
  - GI symptoms
  - Skin conditions
  - Fibromyalgia
  - Suicide
  - Chronic unexplained pain, and general symptoms
  - Disability
  - Poor health status

Limitations of Veteran Studies

- Studies of deployment did not assess actual stress associated with deployment at the time of exposure (the individual's perception of stress).
- Few studies determined severity of combat exposure.
- Many studies assessed numerous exposures, including environmental contaminants, nerve agents, vaccines, limiting the ability to determine associations with psychological stress.
- Virtually all studies were retrospective; therefore, there was a lack of information on pre-deployment health and psychological status and the potential for recall bias.
- Exposures and effects rarely confirmed with appropriate military and/or health records.
- Selection bias in using studies of veterans from registries or in treatment groups; not representative of most veterans.
- Insufficient time may have elapsed for some health effects to be evident, e.g., cancer, heart disease for some veteran populations.

IOM Recommendations

- IOM recommendations:
  - Conduct pre-deployment assessment for medical and psychiatric conditions, and psychosocial status.
  - Conduct post-deployment assessment immediately after return and at approximately 5-year intervals thereafter.
  - Include nondeployed control group of veterans.

- DoD is already taking many actions that will accomplish these recommendations.